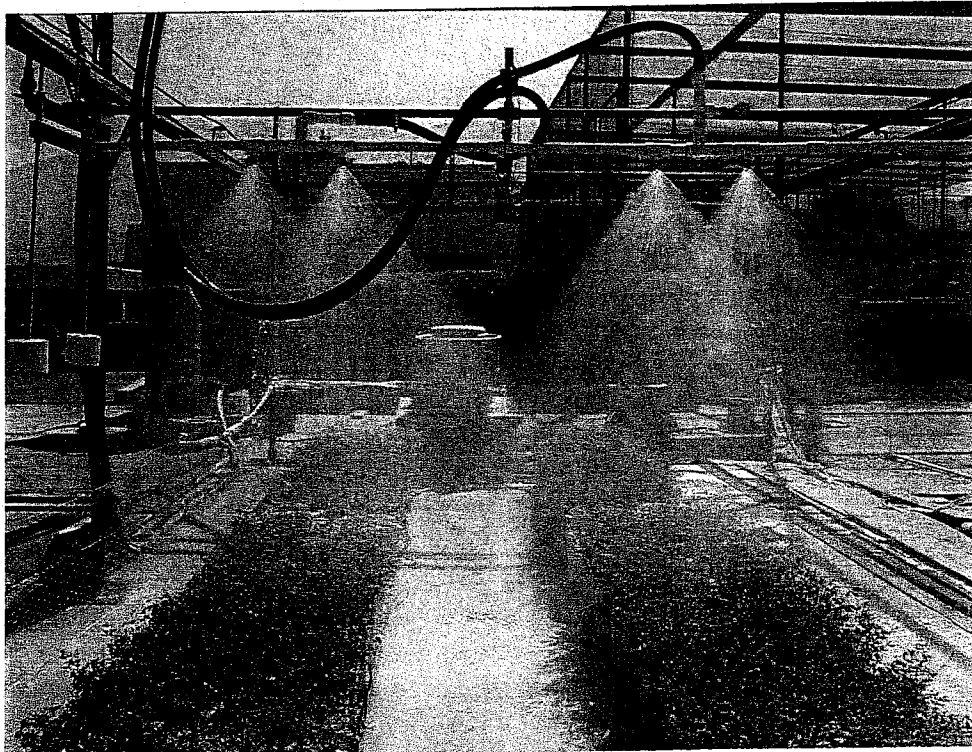


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## Evaluation of Water Quality Criteria for Rain-Irrigation Cropping Systems

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## **Conclusions**

The increase in SAR of the irrigation water had an adverse impact on water infiltration for both the cropped and bare (uncropped) soils. For the bare clay soil even an increase from SAR 2 to SAR 4 resulted in a significant increase in infiltration time (decrease in infiltration rate), while for loam soil the increase in infiltration time was significant at the SAR 6 level. For cropped soil the variance was higher and differences were statistically significant at SAR 6 when paired tests were made. However, the fitted regression model showed decreases in infiltration are predicted for both bare and cropped clay soil and for cropped loam soil as the SAR increased from 2 to 4. For bare loam soil the model was non linear and the decrease in infiltration rate starts above SAR 4.

The decreased infiltration rate in the field can be expected to result in increased surface runoff and thus decreased availability of water to the crop. In conditions where water is limiting, this may result in decreased crop yield. The lack of an adverse impact of irrigation water SAR on yield in the present experiments is likely the result of having confined containers, where the total water infiltrated must be constant for all treatments.

The laboratory measurements of saturated hydraulic conductivity of undisturbed bare soil cores taken from the infiltration experiment also showed a trend of decreasing hydraulic conductivity with increasing SAR. The trend was statistically significant for the loam soil

but not the clay soil. The adverse impacts were statistically significant in bare loam soil when increasing from SAR 2 to SAR 6 for both rain and irrigation water.

For cropped soil the changes in hydraulic conductivity as related to SAR were significant for loam soil under both irrigation and rain. The linear regression model predicts decreases in hydraulic conductivity as the SAR is increased from 2 to 4. The SAR trends were not significant for clay soil, due in part to increased variance. The ability to detect changes in SAR is limited by the experimental uncertainties.

Replicated disturbed soil cores under saturated conditions provide information comparable to more time consuming field infiltration studies. Adverse impacts of SAR on infiltration were statistically significant when increasing SAR from 2 to 6 for loam soils with both irrigation water and rain water and clay soils with rain water.

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